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6/025/0005

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To: "'David Darby'" <DAVEDARBY@utah.gov>, <PRISCILLABURTON@utah.gov>, "'Pam ...
Date: 11/13/2007 9:38 PM
Subject: Alton Coal Development Acid and Toxic sample collection and analysis

CC: "'Chris McCourt'" <CMcCourt@altoncoal.com>, "'Patrick Collins'" <mt.nebo...

Dave,

Thanks for compiling the Alton Coal Development acid- and toxic-forming information. That was no small task I assume! It is helpful to see it all compiled in one location.

It is apparent that there may have been some confusion regarding the process for collection and analysis of samples for acid- and toxic-forming potential from the Coal Hollow project. I think much of the confusion may have resulted from the fact that so many people have been involved with this process in one way or another. Consequently, I will try and give a brief outline of the process that has taken place to date as I understand it.

In November 2005, Alton Coal Development carried out a core drilling program in the proposed Coal Hollow Mine permit area. The purposes of the core drilling activities were 1) to measure coal thicknesses and obtain coal samples for coal quality and geotechnical analysis, and 2) to characterize the overburden and underburden stratigraphy and obtain samples for acid- and toxic-forming potential and geotechnical analysis in the 630-acre project area. The coreholes drilled at this time included CH-01-05, CH-03-05, CH-05-05, and CH-06-05. Each of these holes was drilled according to the following procedure:

1. The hole was augured to approximately 40 feet depth. The upper 40 feet generally consisted of alluvial deposits overlying the Tropic Shale bedrock. Below roughly 40 feet, Tropic Shale bedrock was present. Representative grab samples were collected from selected intervals in the augured upper 40 feet. Generally, at least one grab sample was collected from each distinct zone within the alluvium. In most boreholes, the alluvium consisted primarily of clay or clayey, silty sediments (pretty monotonous). Considerable variability in the alluvial sediments was generally not observed.

2. Below about 40 feet, the borehole was drilled using a continuous coring technique. The holes were drilled down to and through the coal seam into the first stratum beneath the coal seam. The continuous cores were placed in core boxes and stored for future analysis.

After drilling of the coreholes was completed, conversations were had with personnel at the Division of Oil, Gas and Mining to obtain their recommendations for sampling intervals and laboratory chemical analysis parameters for acid- and toxic-forming materials (as specific requirements are not provided in the Utah coal regulations).

Alton Coal subsequently received a written recommendation from DOGM indicating that samples from the shallowest hole (CH-03-05) and the deepest hole (CH-05-05) should be analyzed for acid- and toxic-forming materials. Samples were to be composited over 10-foot intervals. If lithologic units thinner than 10 feet were present, composite samples of those specific intervals were also to be composited. At this time, Alton Coal informed DOGM personnel that samples of the augured upper 40 feet of the boreholes were not collected in some locations. Subsequently, in a written recommendation from DOGM, it was indicated that because samples from the upper 40 feet were not available, the Division would likely require additional sampling of the surface 40 feet during operations.

Subsequent to these correspondences, Alton Coal prepared composite samples for each 10-foot zone of the overburden and underburden. Each laboratory sample was prepared by taking a representative sample from each of the 2-foot intervals and compositing the five 2-foot samples for each zone into a sample bag for lab analysis. (Each core box holds a total of 10 feet of core, which is divided into five 2-foot sub-sections in the box. As a result, the samples as sent to the lab were labeled as, for example, Box 1 CH-5). Generally, the material from the Tropic Shale consisted of (a monotonous) dark gray to black claystone/shale with variable amounts of silt and occasional lenses of bentonitic clay. Consequently, 10-foot composite samples of the Tropic Shale were deemed appropriate and prepared for analysis. Samples from the augured upper 40 feet of the boreholes were not analyzed at that time as per our understanding of the DOGM correspondence in that regard.

Because the proposed project involves surface coal mining operations, the initial sampling and subsequent laboratory analyses were intended to be more intensive than other underground mining operations that are more common in Utah. Mr. Patrick Collins of Mt. Nebo Scientific coordinated with personnel from DOGM and other regulatory agencies at that time regarding an appropriate list of laboratory chemical analytical parameters for the acid- and toxic-forming samples. Subsequently, and in coordination with DOGM, an exhaustive list of laboratory parameters was proposed. This list included those parameters in the Divisions Soils Guideline plus boron and selenium, and for the ground water baseline metals listed in the Division's water monitoring guideline Tech-004. Later, the list of baseline metals to be analyzed was further scrutinized to verify that indicators of potential environmental concerns were included. Because material to be analyzed was meant to characterize overburden and underburden rather than water, other agencies were also consulted such as the Utah Division of Environmental Quality (DEQ). Metals analyzed in projects related to the Resource

Conservation and Recovery Act (RCRA) were reviewed. Based on this review and other research, a list of metals and laboratory analytical methods to be used was implemented. The lab methods focused on quantification of "total" metals. If lab results indicated high concentrations for a given metal, the next step would be to test for its mobilization potential under the proposed project conditions and its potential to pose negative environmental consequences to either water quality or subsoils. No high concentrations of metals were observed in the lab results.

The Division also recommended using a radiation counter to check for radiation above background levels in the samples.

In accordance with these recommendations, Alton Coal developed the exhaustive list of laboratory analytical parameters that was used for the laboratory analyses. Due to an oversight, the background radiation measurements were not performed on the samples at that time.

Subsequent to the August 2007 completeness review of the Alton Coal Development MRP, the Division determined that soluble selenium should be analyzed to a detection limit below 0.1 ppm and that the preliminary radiation assessment should be completed. (These analyses have now been completed, although residual material samples were not available at the laboratory for all sample intervals).

In early 2007 (after the initial laboratory chemical results had been completed), available grab samples of the alluvium from various depths at each of the four borehole locations were sent to the laboratory for acid- and toxic-forming potential analysis. As discussed above, grab samples of the alluvium (upper 40 feet) were not available for every vertical interval at every borehole. At some borehole locations, fresh samples were obtained from soil pits dug at the site using a track-hoe. The alluvium (upper 40 feet) samples were sent to the laboratory for analysis for the purpose of being as thorough as possible in our characterization of acid- and toxic-forming materials in the project area. This information was provided by Alton Coal Development as a supplemental data collection activity and not in response to any directive from DOGM as we understood their recommendations (i.e., it seemed like a good idea to begin characterizing the alluvial sediments with the available samples).

Most of the acid- and toxic-forming information provided to the Division from the Tropic Shale comes from samples in the CH-05-05 borehole. This hole was selected for analysis of the Tropic Shale overburden because it contains the maximum continuous thickness of Tropic Shale cored in any of the boreholes (i.e., any Tropic Shale intervals encountered at the other boreholes are also present in CH-05-05). The Tropic Shale is a regionally extensive geologic formation which was deposited in an open marine

environment and is present over hundreds of square miles. Because of the marine depositional nature of the formation, it is anticipated that there is considerable lateral continuity in individual strata within the formation at the scale of the roughly 630-acre Coal Hollow project area. In other words, a stratum situated a given vertical distance above the base of the formation at one location in the project area is likely similar to the corresponding stratum at other locations in the 630-acre project. Thus, by collecting continuous vertical samples from the Tropic Shale at CH-05-05, the acid- and toxic-forming characteristics of the Tropic Shale bedrock over the 630-acre project area is believed to be well characterized.

In contrast to the Tropic Shale, the alluvium in the project area is not regionally continuous. Although the alluvium is dominated in the project area by silty, clayey materials, the alluvial sediments in the project area have accumulated through alluvial fan deposition, sheetfloods, debris flows and mud flows. These processes are typically localized in extent and vertically and laterally variable. Also, the alluvial sediments may locally be derived from different parent materials. Consequently, there may be little correlation between an alluvial sample from a given depth interval in one portion of the project area and a sample from the same depth at a different portion of the project area. Consequently, it seems to make sense to analyze many samples of alluvium from different locations and depths to obtain an accurate characterization of the acid- and toxic-forming materials in the alluvium.

As outlined above, based on our understanding of DOGM's recommendations, we are committed to providing additional information on acid- and toxic-forming materials from the upper 40 feet of the stratigraphy during mining operations.

I hope this summary better explains our understanding of the process that has taken place to this point. Please let me know if you have any questions.

Thanks,

Erik

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